Statement of Work
for the Refurbishment of
Two (2) Roots Dresser 10x12 RGS (non high vacuum) Pumps
For Vacuum Service at the B-2 Test Facility

1.0 Introduction

This Statement of Work (SOW) covers the refurbishment of two (2) Roots Dresser 10x12 RGS Rough Vacuum Pumps (non-high vacuum). The pumps are to be returned to like-new condition, meeting all of the specifications of the original pumps. The pumps are located at NASA Glenn Research Centers Plum Brook Station 6100 Sandusky Ohio 44870, in the B2 Test Facility. NASA will ship the pumps to the Contractor work site. The Contractor shall then return the pumps to Plum Brook Station after completion of work. The pumps have not been used in any hazardous materials service.

NASA Glenn Research Center (GRC) Plum Brook Station (PBS) assumes that by quoting this Statement of Work, the Offeror is knowledgeable in the repair and operation of Rotary Lobe Blowers. It follows that the Contractor has access to the equipment necessary to operationally test these Rotary Lobe Blowers.

2.0 Scope

2.1 General

This SOW covers the disassembly, inspection, reassembly and operational testing of two (2) Roots Dresser 10x12 RGS Vacuum Pumps as well as documentation of the work.

The pumps shall be rebuilt one at a time to keep the B-2 facility in operating condition. NASA GRC PBS will ship one pump to the Contractor which shall rebuild the pump and return it to NASA GRC PBS. Upon reinstallation by NASA the second pump will be removed from service and shipped to the Contractor which shall rebuild the second pump and return it to NASA.

The work shall include the refurbishment or replacement of lubricating oil pumps, oil cooler, and all other ancillary equipment physically attached to the pumps. The Contractor shall quote on the refurbishment of the pumps based on this document and based on the Original Equipment Manufacturer (OEM) Specifications and instructions. The Contractor shall utilize sub-Contractors, if required, only for individual parts level work or testing. The Contractor shall complete this Statement of Work in its entirety. In the event of a conflict between this document and the Original Equipment Manufacturer (OEM) specifications, the OEM specifications shall supersede.

2.2 Location of Work

Work shall be performed at Contractor work site.

2.3 Items to be Provided by the Contractor

The Contractor shall provide all labor, services, tools, equipment, and permits required to complete this Statement of Work, except those listed in Section 2.4.

2.3.1 The Contractor shall service the pumps one at a time so as to keep the B-2 facility in an operation ready state. One pump will remain at NASA in service while the other is being serviced by the Contractor.

2.3.2 The Contractor shall provide a written inspection report complete with photographs showing the external state of each pump as received by the Contractor.

2.3.3 The Contractor shall provide a written inspection report on each disassembled pumps. The report and photographs shall sufficiently document the internal state of each pump.

2.3.4 The Contractor shall provide all cleaning agent(s), such as Crystal Simple Green or an equivalent approved vacuum pump cleaning agent(s).

2.3.5 The Contractor shall provide a list of and specifications for all greases, oils and/or sealing agents to NASA for approval prior to be used on the pumps.

2.3.6 The Contractor shall provide new, fresh greases, oils, sealing agents, etc. required to complete this SOW. All greases, oils, and sealing agents shall be vacuum compatible for rough vacuum operation.

2.3.7 The Contractor shall provide to NASA a written list of the OEM suggested replacement parts required for the refurbishment

2.3.8 The Contractor shall supply all O-rings and gaskets that are fully vulcanized without a glued joint.

2.3.9 The Contractor shall supply all mechanical fasteners, tubing or piping, and other components as specified in the OEM rebuilding procedures, to accomplish this statement of work.

2.3.10 The Contractor shall provide a written report detailing the work that was performed on each pump.

2.3.11 The Contractor shall repair the existing vacuum leak in the sealing surface between the body and end cap of pump P12.

2.3.12 The Contractor shall operationally test each Roots Rotary Lobe vacuum pumps as specified by the OEM. NASA personnel shall be provided the opportunity to witness the testing of each pumps.

2.3.13 The Contractor shall provide helium leak checking of each assembled pumps using a helium mass spectrometer leak detector.

2.3.14 The Contractor shall provide a written report on the results of the testing of each pump.

2.3.15 The Contractor shall cover the inlet / outlet flange sealing surfaces with a non-abrasive, water resistant sheet and plywood disk, crate and ship each pump to NASA.

2.4 Materials, Equipment, and Efforts provided by NASA

2.4.1 Disconnection / removal

NASA will disconnect and remove the first Roots Dresser 10x12 RGS Vacuum Pump from the B2 facility and ship it to the Contractor for rebuilding service and testing. Upon return of the pump to NASA by the Contractor, NASA will re install the first pump and remove the second pump and ship it to the Contractor for rebuilding service.

NASA will package and ship the first Roots Dresser 10x12 RGS Vacuum Pump to the Contractor work site upon receipt of the address, phone number and point of contact information. Any Return Materials authorization number, or its equivalent shall also be provided.

2.4.2 Reconnection / installation

NASA will reconnect and install the two (2) Roots Dresser 10x12 RGS Vacuum Pumps in the B2 facility.

2.5 Waste Disposal

The Contractor shall dispose of any material and waste in accordance with all State and Federal Laws and Regulations.

2.6 Security Requirements if an On site visit is required

All Contractor employees visiting the PBS shall be required to coordinate access with the NASA Main Gate. Access shall be restricted to the work site and travel between the Main Gate and the work site.

Contractor employees shall obtain an identification badge prior to entry onto the Station. Contractor employees shall wear these identification badges at all times. Access for any Contractor employee who is not a U.S citizen shall be coordinated with the Plum Brook Station Security Manager at least six (6) weeks in advance.

2.7 Safety, Health, & Environmental Considerations

The Contractor shall perform the work listed in the Statement of Work, in accordance with all applicable Local, State and Federal laws and/or regulations.

3.0 Applicable Documents and Definitions

3.1 References and Codes

3.1.1 The work shall be accomplished in accordance with the latest revisions of the Occupational Safety and Health Association (OSHA) codes and related reference materials as applicable, as well as any Local, State and/ or Federal codes or regulations.

3.1.2 Effluent and wastes generated from work associated with this SOW shall be collected and disposed of in accordance with all applicable Federal, State, and Local laws and regulations.

3.2 Definition of Terms

"NASA" means the National Aeronautics and Space Administration, Glenn Research Center, Plum Brook Station, part of the Government of the United States.

"Glenn Research Center" means the National Aeronautics and Space Administration, Glenn Research Center, Plum Brook Station, part of the Government of the United States.

"Contractor" means the Contractor, its employees, agents, performing the work detailed in this SOW.

"SubContractor" means a person or business which has a contract (as an "independent Contractor" and not an employee) with a Contractor to provide some portion of the work or services on a project which the Contractor has agreed to perform.

"Crystal Simple Green" means a specific cleaner and degreaser made by Sunshine Makers, Huntington Harbor, California. Substitution of Simple Green is not acceptable.

"OEM" means Original Equipment Manufacturer of record who designed and fabricated the equipment or company who retains all legal rights to the equipment design and manufacture.

4.0 Technical Tasks and Quality Assurance

The Contractor shall perform the following activities:

4.1 Two Roots 10x12 RGS Vacuum Boosters shall be refurbished and certified by a knowledgeable Contractor, trained in the repair of Rotary Lobe Blowers.

The pumps shall be serviced in a sequential manner. The first pump will be shipped and upon its return from the Contractor to NASA, the second pump shall be shipped.

4.1.1 Provide a written inspection report complete with photographs showing the state of each pump as received by the Contractor. The report and photographs shall sufficiently document each pump in their post shipped, as received condition to accurately identify the need for any additional work or components beyond the Contractors initial quote. The report shall include all clearance and gear backlash measurements in the as received state.

4.1.2 Complete disassembly and micrometer inspection of major internal and external components .i.e., Impellers, bearing journals, seal areas, labyrinth seals, bearing bores, gears and head plate surfaces.

4.1.3 The Contractor shall provide a written inspection report on the work performed in section 4.1.2 above. The report and photographs shall sufficiently document each pump in their disassembled state to accurately identify the need for any additional work or components beyond the Contractors initial quote.

4.1.4 NOTE: In the event of excessive wear or damage to any of these components, NASA shall be notified in writing prior to continuance of work. A report shall be filed with NASA listing the extent of repairs required to each pump and the estimated cost to perform the repairs.

4.1.5 Complete mechanical and chemical cleaning of all internal components and external surfaces including external lubrication system. Internal surfaces exposed to process gases shall be cleaned according to the OEM approved procedures.

4.1.6 Provide a written test report describing the cleaning method used and the level of cleanliness.

4.1.7 Replace consumable parts, elastomers, filters, oil sight glass and other basic wear items.

4.1.8 Buff, file and polish all fits.

4.1.9 Check, clean, and pressure test heat exchanger.

4.1.10 Replace oil filter elements.

4.1.11 Set all clearances and time lobes according to OEM specifications. These values shall be recorded.

4.1.12 Assemble each pump according to OEM instructions.

4.1.13 Complete assembly shall be test run with performance monitored and recorded and compared to OEM specifications. This shall require the Contractor to supply flanges, pipe fittings, vacuum instrumentation, backing pump, and any other equipment or supplies to perform the test. NASA personnel shall be provided the opportunity to witness the testing of each pump. NASA personnel shall be notified of the day and time of pump operational tests at a minimum of 2 normal work days before the test is to commence.

4.1.14 After break-in period has been met, system shall be leak checked with a Helium Mass Spectrometer. Leak values shall be recorded.

4.1.15 A written test report describing the test results for each pump shall be delivered to NASA. The report shall include the information listed above as well as the vibration signature for the pumps, steady state pump oil temperatures and pressures as well as helium leak check data.

4.1.16 Pumps shall be shipped free of oil.

4.1.17 Oil shall be shipped in separate containers and clearly marked for use on specific pump.

4.1.18 The pumps existing surface coating shall be removed and shall be re-painted with one coat of rust inhibitive primer and a finish coat of machinery enamel.

4.1.19 The Contractor shall apply a new corrosion resistant coating over the internal surfaces of the gear box and gear cavity. The coating shall be approved for use by the OEM.

4.2 Crating of Equipment for Shipment

4.2.1 Mechanical Vacuum Pumps shall be crated for shipment. The pump inlet flange seal surface shall be protected by plastic sheeting and plywood covers before shipment.

4.2.2 The pumps shall be covered during shipment with materials sufficient to prevent exposure to rain, snow, and other debris.